

Discovery of *Hemicarabus macleayi* (Coleoptera, Carabidae) from the Alpine Zone of the Island of Rishiri-tô, Northeast Japan

Yûki IMURA

Shinohara-chô 1249–8, Kôhoku-ku, Yokohama, 222–0026 Japan

Abstract *Hemicarabus macleayi* DEJEAN is recorded for the first time from the alpine zone of the Island of Rishiri-tô, Northeast Japan, and is described as a new subspecies under the name *amanoi*.

In the summer of 2001, a female specimen of a strange carabid beetle was collected by Mr. Masaharu AMANO on a path leading to the top of Mt. Rishiri-zan on the Island of Rishiri-tô, off the western coast of the northern tip of Hokkaido, Northeast Japan. Three years later, it was submitted to me for examination through the courtesy of Mr. Naoki TODA. It was evident at a glance that the beetle was identical with or very closely related to *Hemicarabus macleayi*, though somewhat different in details from all the known races of the species. This was most unexpected, since the main distributional range of *H. macleayi* was the northeastern part of the Eurasian Continent (Southeast Siberia, Amur, Maritime Territory, northeastern North Korea, Yakut, Magadan, the Kamchatka Peninsula, etc.) and the range extended onto the Island of Sakhalin at the most. Anyway, it was apparent that the carabid in question was an unrecorded species from the Japanese territory. To prove its indigenoussness on Rishiri-tô and to know its own characteristics more precisely, it was necessary to collect additional specimens. In the summer of this year, I myself made an investigation on Rishiri-zan together with Mr. TODA and Mr. Yoshiyuki NAGAHATA,¹⁾ and fortunately succeeded in collecting another female specimen in the alpine zone of the same mountain. In the following lines, I am going to record them and describe this completely isolated population as a new subspecies of *H. macleayi*.

The higher system of the subtribe Carabina adopted in this paper is the same as that proposed by IMURA (2002).

This study will be presented at the 17th Annual Meeting of the Japanese Society of Coleopterology to be held in Odawara, 20–21 November 2004.

1) This survey was performed under the permission of the Ministry of Environment (permission No. 040721009 of the West Hokkaido Regional Office for Nature Conservation).

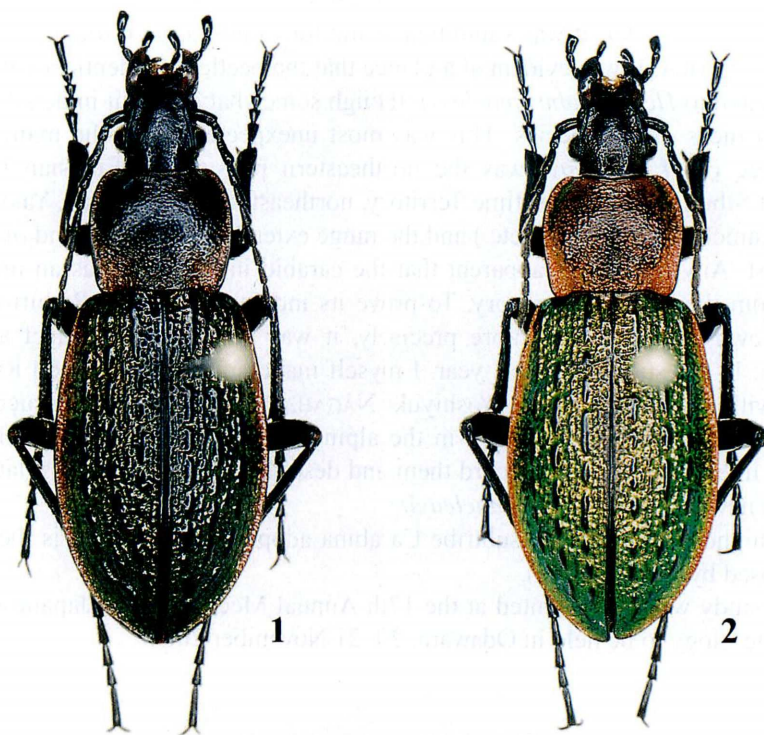
Hemicarabus macleayi amanoi IMURA, subsp. nov.

[Japanese name: Rishiri-no-makkurei-seaka-osamushi]

(Figs. 1–2)

Length: 17.2–17.8 mm (including mandibles). Head black, partly bearing a faint coppery reddish tinge in fresh individual; pronotum and elytral margins coppery red with a strong metallic lustre; elytra excluding the marginal areas dark to light yellowish green with rather strong metallic lustre; elevated part of pronotum and elytra almost black and not strongly polished; venter and appendages black.

Most closely allied to subsp. *coreensis* BREUNING (1933, p. 857; type locality: “Korea, Mts. Paik-to-san” [=Baegdu San in North Korea]), but distinguishable from that race in the following points: 1) pronotum with the lateral sides a little less roundly arcuate; 2) elytra apparently slenderer, 1.54 times as long as wide in both the specimens examined, and less acutely narrowed towards apices; 3) secondary and tertiary intervals of elytra more strongly developed and irregularly connected with primaries. From the nominotypical *macleayi* DEJEAN (1826, p. 485; type locality: “Daourie”



Figs. 1–2. *Hemicarabus macleayi amanoi* IMURA, subsp. nov., from the alpine zone of Mt. Rishiri-zan (1, holotype, ♀; 2, paratype, ♀).

[=Daurija in Southeast Siberia]) and *splendidulus* SÉMENOW²⁾ (1888, p. 207; type locality: “la baie De-Castries dans la Sibérie orientale maritime” [=De-Kastri in the Maritime Territory]), the new race is readily discriminated by a little longer antennae, much slenderer elytra and robuster elytral intervals.

Male unknown.

Type series. Holotype: ♀, 11~12-VIII-2004, Y. IMURA, N. TODA & Y. NAGAHATA leg., deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo. Paratype: 1 ♀, summer of 2001, M. AMANO leg., now preserved in the collection of Y. IMURA.

Type locality. Alpine zone of Mt. Rishiri-zan, on Is. Rishiri-tô, off the western coast of the northern tip of Hokkaido, Northeast Japan.

Derivation of the name. The present new race is named after Mr. Masaharu AMANO [天野正晴] who first collected the specimen and submitted it to me for study.

Discussion

Hemicarabus macleayi is distributed mainly in the subarctic zone of northeastern Eurasia and Sakhalin, and is recorded for the first time from the Japanese territory in the present paper. The Rishiri-zan (1,721 m in height at the highest point), on which the Japanese race inhabits, is a stratovolcano formed on the bed rock of the Neocene (KOBAYASHI, 1999) and was volcanically active until the Pleistocene (SEGAWA, 1974). Therefore, the origin of *H. macleayi* in the same island cannot be older than that geological time and the species seems to have been established rather recently when the island was connected with the continent via Sakhalin by the regression of the sea in certain stage of the Glacial Period. The Rishiri population is thus considered to be a relict of the past cold time and must have been isolated in the alpine zone of Rishiri-zan where the environmental condition suitable for this species is barely maintained. This distributional pattern is similar to that of *Miscodera arctica* or *Trechus apicalis*, both of which are widely distributed in the subarctic zone of Eurasia and North America, and have so far been found, within the Japanese territory, only from the high altitudinal area of Rishiri-tô (cf. HABU, 1972, p. 30; UENO, 1966, pp. 69–74, 1984, p. 142). Incidentally, average annual temperature observed near the summit of Rishiri-zan is estimated at about -2.6°C (TAKAHASHI, 1999, p. 58) which is a little lower than that observed at the same height on the Daisetsu-zan Mountains, a central massif of Hokkaido.

The first specimen of *H. macleayi* in Rishiri-tô was picked up somewhere on a climbing route to the summit of Rishiri-zan, and the second one was obtained by pit-fall traps set in a narrow scree slope along the path in the alpine zone. The beetle was not collected from such environments as the alpine snow meadow, community of *Pinus*

2) This taxon, originally described as “*Carabus Mac-Leayi* FISCH, Var. *splendidulus*”, should be regarded as a mere colour variation of the nominotypical subspecies.

Table 1. List of the subtribe Carabina recorded from Is. Rishiri-tô.

-
- | | |
|----|--|
| 1. | <i>Hemicarabus macleayi amanoi</i> IMURA, subsp. nov. |
| 2. | <i>Hemicarabus tuberculosus tuberculosus</i> DEJEAN et BOISDUVAL, 1829 |
| 3. | <i>Aulonocarabus kurilensis rishiriensis</i> NAKANE, 1957 |
| 4. | <i>Asthenocarabus opaculus opaculus</i> PUTZEYS, 1875 |
| 5. | <i>Carabus arvensis hokkaidensis</i> LAPOUGE, 1924 |
| 6. | <i>Carabus granulatus yezoensis</i> BATES, 1883 |
| 7. | <i>Pachycranion kolbei hanatanii</i> IMURA, 1991 |
| 8. | <i>Acotolabrus gehinii aereicollis</i> HAUSER, 1921 |
-

pumila or dwarf scrub of *Betula ermanii* and *Alnus maximowiczii*, etc. Though our knowledge is still too poor on its true biotope and mode of life, the species may prefer rather barren place as is often observed in the other species belonging to the same genus. This might be a reason why we have been unable to find the carabid in question until recent years in spite of systematic surveys made by experienced carabidologists (cf. UÊNO, 1961, in HABU, 1972; MATSUMOTO, 1978, in UÊNO, 1984, pp. 141–142; UÊNO, NISHIKAWA, SAITO & SATÔ, 1990, in UÊNO, 1991, p. 110; YASUDA *et al.*, 1991, etc.).

The most noticeable characteristics of the Rishiri population are the relatively slender elytra, which are much less acutely narrowed towards the apices than in the other races of *H. macleayi*. Its elytral sculpture is also unique in having more strongly developed secondary and tertiary intervals. Since the two specimens examined had the same character states and were distinguishable from the other races even in comparison between the females, I have decided to describe the Rishiri one as a new subspecies. Needless to say, however, the final conclusion should be drawn after examining the male and its genitalic organ.

Totally seven species of the subtribe Carabina have hitherto been recorded from the Island of Rishiri-tô, and the present new race becomes the eighth constituent (Table 1). Of these, *Hemicarabus macleayi*, *Aulonocarabus kurilensis* and *Pachycranion kolbei* are differentiated to the subspecies endemic to the island and the other five are common at the subspecific level with those distributed in the mainland of Hokkaido. The most noticeable difference in the carabid fauna between Rishiri-tô and Hokkaido is the absence of *Homoeocarabus maeander*, *Leptocarabus arboreus* and *Damaster blaptoides* in the former. The biotope of *H. maeander* is usually restricted to moors or marshy meadows, and it is no wonder that the carabid fauna of Rishiri-tô lacks this species, as there is little environmental condition suitable for this species in the island. On the contrary, it is very strange that the latter two are not found on Rishiri-tô, since they are the commonest everywhere in the mainland. This may be due to some geohistorical or ecological reason, but it is difficult to elucidate at present why the carabid fauna of Rishiri-tô lacks these two species. It is worth noting that the two *Hemicarabus* species occur in the same island, though they are not strictly sympatric. One of the two, *H. tuberculosus*, mainly inhabits grassy or barren plain in the low altitudinal area,

while *H. macleayi* is considered to be restricted to a distinctive environment in the alpine zone. In the same zone of Rishiri-zan, there also inhabit *Aulonocarabus kurilensis*, *Asthenocarabus opaculus*, *Pachycranion kolbei* and *Acoptolabrus gehinii*. However, they are usually dominant in the meadows or dwarf scrubs and rarely collected from barren places.

Though the habitat of the new race is located in the special protection zone of the national nature conservation area called the Rishiri-Rebun-Sarobetsu National Park, a special attention should be paid for its protection mainly against disturbance caused by poachers aimed at this beetle, since it is a beautifully colored newcomer added to the Japanese carabid fauna for the first time in long years.

Acknowledgements

I wish to express my sincere thanks to Mr. Masaharu AMANO (Seto, Aichi) for his kindness in submitting invaluable specimen to me for study. Mr. Naoki TODA (Nagoya, Aichi) entrusted me with the study of the very important specimen and helped my investigation in the field together with Mr. Yoshiyuki NAGAHATA (Yonezawa, Yamagata). Deep gratitude should be expressed to these colleagues of mine. I have to thank Mr. Mitumasa KAWATA (Sapporo, Hokkaido), Dr. Akiko SAITO (Natural History Museum and Institute, Chiba), Mr. Helmut SCHÜTZE (Gleichen, Germany), Prof. Nobuyuki TAKAHASHI (Hokkai-Gakuen University, Sapporo, Hokkaido) and Mr. Nobuki YASUDA (Daisetsuzan National Park Soukkyo Visitor Center, Hokkaido) for their help in providing either specimens for comparative study or necessary literature. Hearty thanks are also due to Dr. Shun-Ichi UENO (National Science Museum, Tokyo) not only for kindly taking trouble to get a permission of my survey in the special protection zone of Rishiri-tô, but also for providing necessary literature and reviewing the manuscript of this paper.

要 約

井村有希：利尻島の高山帯におけるマックレイセアカオサムシの発見。—— マックレイセアカオサムシは、ユーラシア大陸北東部を中心に分布する種で、北朝鮮の北東部やカムチャツカ半島、さらにサハリンにも生息しているが、これまでわが国からは知られていなかった。ところがさいきん、利尻島の高山帯に生息していることがあきらかになったため、日本産オサムシのあらたなメンバーとして記録するとともに、外部形態の差に基づき、新亜種名を与えて記載した。本種の生息地は、国立公園の特別保護区域内に位置しているものの、その範囲は利尻山高所の特殊な環境に限定されており、日本のファウナに種のレベルであらたに加わったオサムシ、しかも美麗種であることから、まंनीち本種に狙いを定めた密猟が行われると、採集圧による個体数の激減、ひいては個体群としての存続の危機が現実のものとなりかねない。本種の詳しい分布状況や生態は未知であるため、こんごさらに綿密な調査が必要であることは論を待たないが、同時にその保護に対する対策が急務となるだろう。

References

- BREUNING, S., 1932–'37. Monographie der Gattung *Carabus* L. *Best.-Tab. eur. Coleopt.*, (104–110): 1–1610, 41 pls. Reitter, Troppau.
- DEJEAN, P., 1826. *Species Général des Coléoptères de la Collection de M. le Comte DEJEAN*, **2**, VIII+501 pp. Paris-Crenot.
- HABU, A., 1972. On some Carabidae found by Dr. S.-I. UENO in Hokkaido, North Japan (Coleoptera, Carabidae). *Mushi, Fukuoka*, **46**: 29–38.
- IMURA, Y., 2002. Classification of the subtribe Carabina (Coleoptera, Carabidae) based on molecular phylogeny. *Elytra, Tokyo*, **30**: 1–28.
- KOBAYASHI, T., 1990. Rishiri-kazan. In *Nihon-no-chishitu "Hokkaido-chihô"*. Henshû inkai (ed.), *Nihon-no-chishitu, 1, Hokkaido-chihô*, 172–173. Kyôritsu-shuppan, Tokyo. (In Japanese.)
- SEGAWA, S., 1974. *Nihon-chikei-shi, Hokkaido-chihô*. 303 pp. Asakura-shoten, Tokyo. (In Japanese.)
- SÉMENOW, A., 1888. Notes synonymiques et systématiques sur diverses espèces du genre *Carabus* L. *Horae Soc. ent. ross., S.-Peterburg*, **22**: 207–212.
- TAKAHASHI, N., 1999. Air temperature observation from the autumn of 1996 to the spring of 1998 on the summit of Mt. Rishiri-zan. *Study on periglacial phenomena and environments in the alpine zone of Japan. Report of Research Project, Grant-in-aid for Scientific Research (B), Ministry of Education, Sapporo*, 57–69. (In Japanese.)
- UENO, S.-I., 1966. *Trechus apicalis* (Coleoptera, Carabidae) in the northern Kuriles. *Bull. natn. Sci. Mus., Tokyo*, **9**: 69–74.
- 1984. Additions to the trechine fauna of Northeast Japan (Coleoptera, Trechinae). *Ibid.*, (A), **10**: 135–143.
- 1991. Small localized species of *Epaphius* (Coleoptera, Trechinae) from northern Hokkaido, Northeast Japan. *Mem. natn. Sci. Mus., Tokyo*, (24): 105–111.
- YASUDA, N., E. NISHIYA & M. SATO, 1991. Insect faunal survey of Is. Risiri and Is. Rebun. The vertical distribution of ground beetles communities in Mt. Risiri, Is. Risiri, Hokkaido. *Annual Bull. Risiri Town Museum, Rishiri-chô*, (10): 13–28. (In Japanese, with English title.)